CDP-EX100

SERVICE MANUAL

AEP Model
UK Model
E Model

This set is the CD player section in
MHC-EX50/EX70AV/EX100AV.

Model Name Using Similar Mechanism	CDP-EX10
CD Mechanism Type	CDM28-5BD19
Base Unit Name	BU-5BD19

SPECIFICATIONS

CD player

System: Compact disc and digital audio system

Laser: Semiconductor laser (λ=780 nm)
Emission duration: continuous

Laser output: Max 44.6 µW*
* This output is the value measured at a distance of 200 mm from the objective lens surface on the Optical Pick-up Block with 7 mm aperture.

Wavelength: 780 – 790 nm

Frequence response: 2 Hz – 20 kHz (±0.5 dB)

Signal-to-noise ratio: More than 105 dB

Dynamic range: More than 95 dB

Outputs

CD OUT (phono jacks):
Output level 2 V (at 50 kilohms)
Load impedance over 10 kilohms

CD DIGITAL OPTICAL OUT (Square optical connector jack, rear panel):
wave length 660 nm
output level –18 dBm

Dimensions
Approx. 280 x 82.5 x 280 mm (11 1/8 x 3 1/4 x 11 1/8 in) (w/h/d) incl. projecting parts and controls

Mass: Approx. 2.1 kg (4 lb 10 oz)

Design and specifications are subject to change without notice.

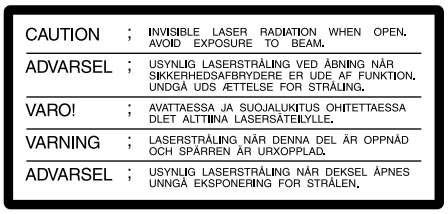
MICROFILM

COMPACT DISC PLAYER

SONY®

The laser component in this product is capable of emitting radiation exceeding the limit for Class 1.

The following caution label is located inside of the unit.


CAUTION ; INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
ADVARSEL ; USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDS ÆTTELSE FOR STRÅLING.
VARO! ; AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA LASERSÄTEILYLLE.
VARNING ; LASERSTRÅLING NÄR DENNA DEL ÄR OPPNÅD OCH SPÄRREN ÄR URXOPPLAD.
ADVARSEL ; USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN.

This appliance is classified as a CLASS 1 LASER product.
The CLASS 1 LASER PRODUCT MARKING is located on the rear exterior.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Notes on Chip Component Replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

NOTES ON HANDLING THE OPTICAL PICK-UP BLOCK OR BASE UNIT

The laser diode in the optical pick-up block may suffer electrostatic breakdown because of the potential difference generated by the charged electrostatic load, etc. on clothing and the human body.
During repair, pay attention to electrostatic breakdown and also use the procedure in the printed matter which is included in the repair parts.
The flexible board is easily damaged and should be handled with care.

NOTES ON LASER DIODE EMISSION CHECK

The laser beam on this model is concentrated so as to be focused on the disc reflective surface by the objective lens in the optical pick-up block. Therefore, when checking the laser diode emission, observe from more than 30 cm away from the objective lens.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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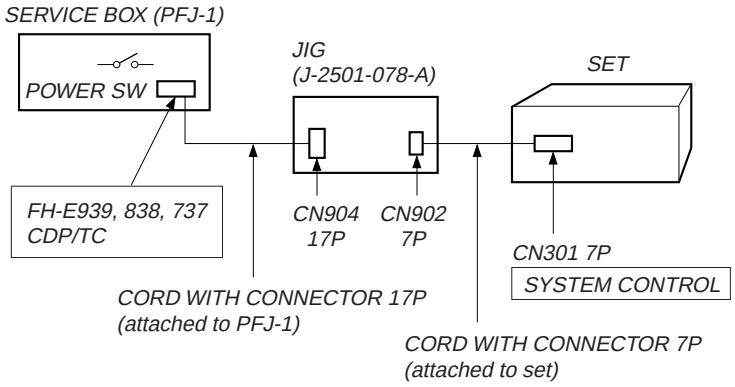
SECTION 1
SERVICE NOTE

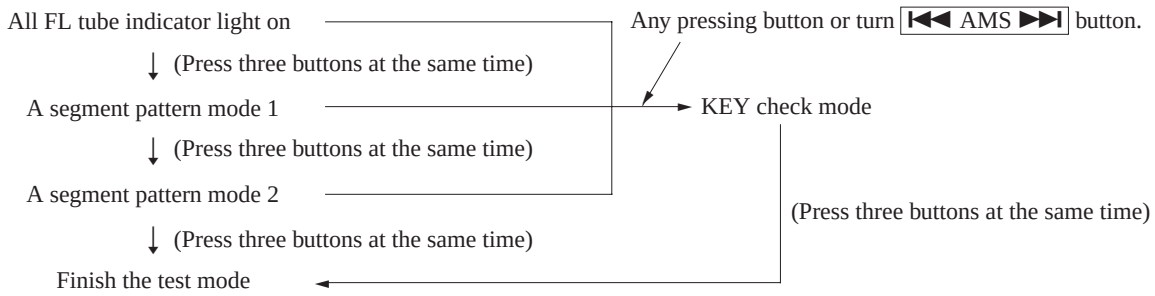
• How to operate with a single unit

Normally this set does not operate with a single unit.
When you must be mending, connect to other unit.
If the SYSTEM POWER switch of the amplifire is set to ON, the power supply of the set is turned on.
In case of other unit is nothing, the service box (PFJ-1) and exclusive jig (J-2501-078-A) are necessary to operate the set with a single unit.
In case of above mentioned, press the ■ button and TIME button at the same time, to enter the power on.



• FL tube/ KEY check mode

After to enter the power on, when ■ button, TIME button and ▶▶ button are pressed at the same time, you will be check FL tube.
Whenever press the above mentioned three buttons at the same time, change to check mode of FL tube.
Under check mode of FL tube when any pressing button or turn I◀◀ AMS ▶▶I button, change to KEY check mode.
To finish KEY check mode, press the above mentioned three buttons at the same time.


All FL tube indicator light on
(Press three buttons at the same time)
A segment pattern mode 1
(Press three buttons at the same time)
A segment pattern mode 2
(Press three buttons at the same time)
Finish the test mode
Any pressing button or turn I◀◀ AMS ▶▶I button.
KEY check mode
(Press three buttons at the same time)

Note 1)

All FL tube light on mode is kept when three buttons which is pressed to enter all FL tube light on mode, release at the same time. If you will be release failure them, it is moved to KEY check mode after all FL tube light on mode.

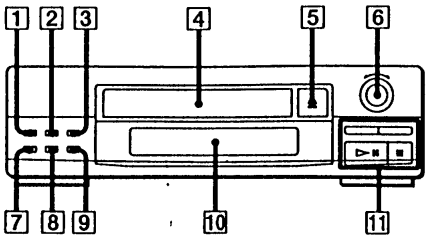
Note 2)

Under KEY check mode, every time and button pressed or I◀◀ AMS ▶▶I button turned on, figure on " KEY= " of FL tube is increased.

SECTION 2
GENERAL

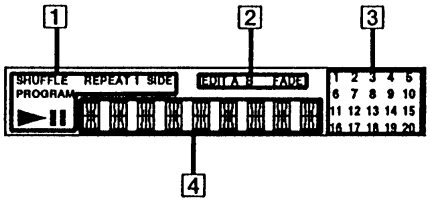
This section is extracted from instruction manual.

Front Panel



1 PLAY MODE button (8, 15)
2 REPEAT button (9)
3 TIME button (7)
4 Disc tray (7)
5 ⏏ OPEN/CLOSE button (open/close of the disc tray) (7, 13)
6 ⏮ AMS ⏭ control (8, 15)
7 EDIT button (14, 15)
8 CHECK button (9, 15)
9 CLEAR button (9)
10 Display window (7, 14, 15)
11 CD player operating buttons
◀◀/▶▶ (manual search) (8)
▷II (play/pause) (7, 14)
■ (stop) (7, 13)

Display Window

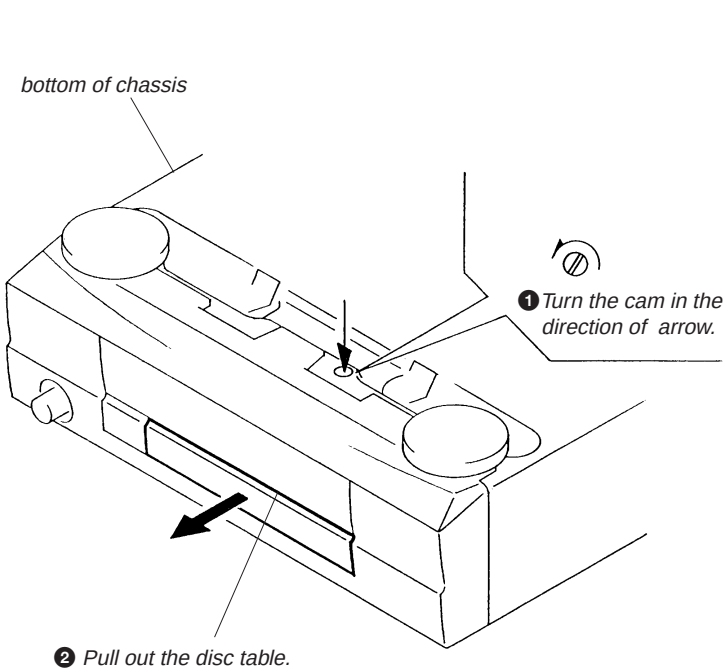


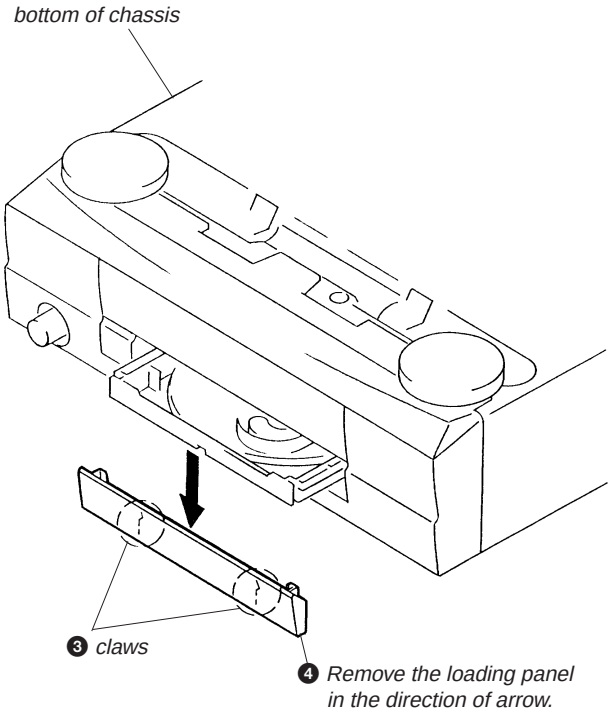
1 CD play mode indication (7)
2 CD edit mode indication (14)
3 Music calendar (7, 14)
4 Step/track number/playing time indication (7, 9, 14)

SECTION 3
DISASSEMBLY

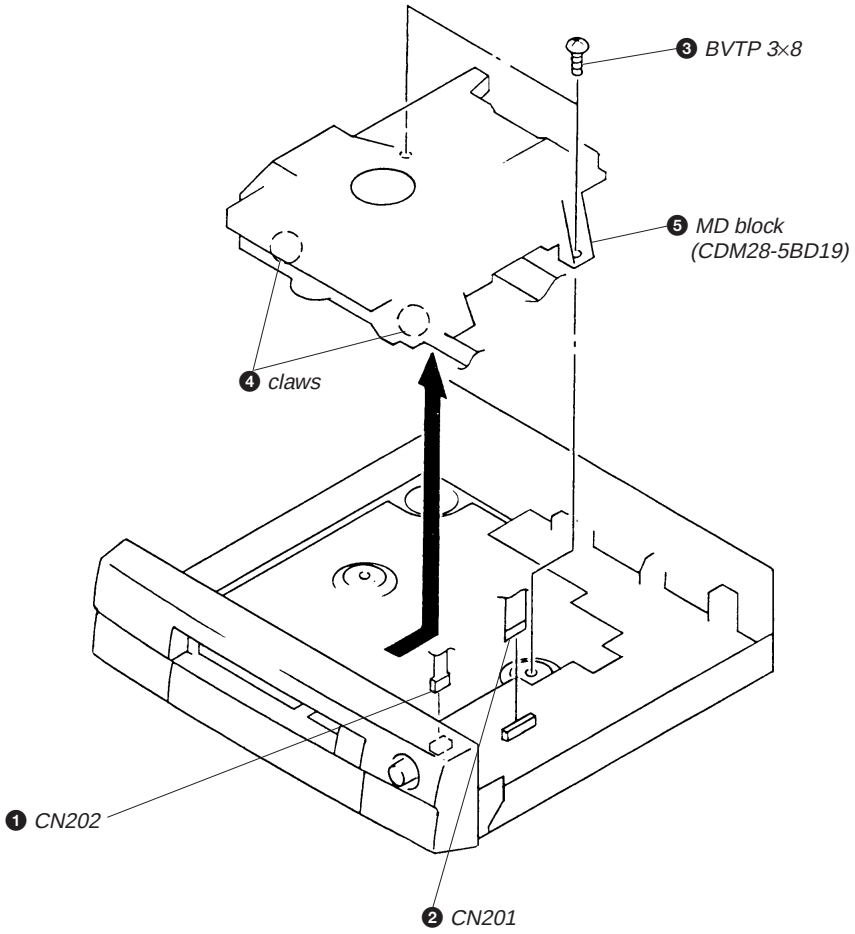
Note : Follow the disassembly procedure in the numerical order given.

3-1. LOADING PANEL

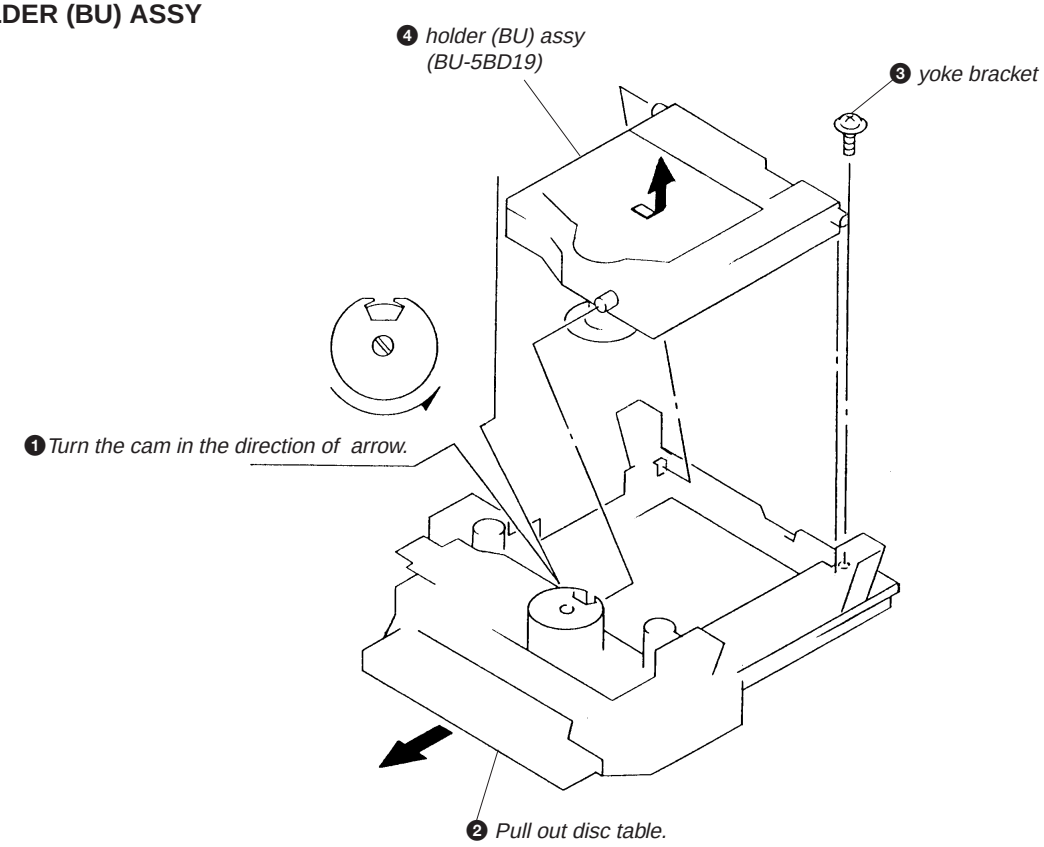




3-2. MD BLOCK



3-3. HOLDER (BU) ASSY

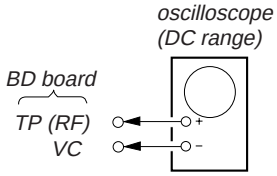


SECTION 4
ELECTRICAL ADJUSTMENTS

Note :

1. Basically designed to operate without adjustment. Therefore, check each item in order given.
2. Use YEDS-18 disc (3-702-101-01) unless otherwise indicated.
3. Use an oscilloscope with more than 10MΩ impedance.
4. Clean the objective lens by an applicator with neutral detergent when the signal level is low than specified value with the following checks.
5. Adjust the focus bias adjustment when optical block is replaced.

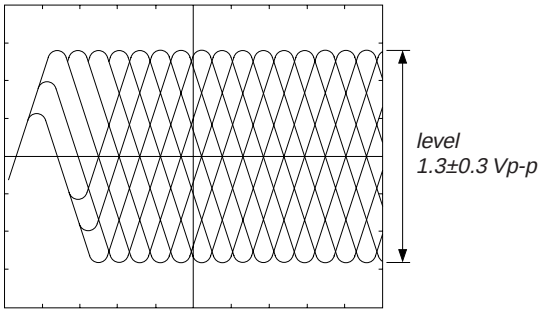
Focus Bias Adjustment



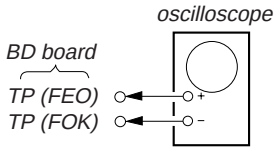
Procedure:

1. Connect oscilloscope to test point TP (RF). (GND terminal : VC)
2. Turn Power switch on.
3. Put disc (YEDS-18) in and playback.
4. Adjust RV101 so that the waveform is clear.
   (Clear RF signal waveform means that the shape " ◇ " can be clearly distinguished at the center of the waveform.)
5. After adjustment, check the RF signal level.

- RF signal
  VOLT/DIV : 200 mV
  TIME/DIV : 500 nS



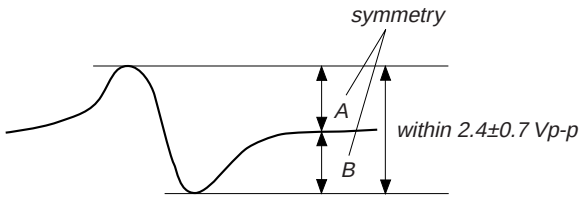
S Curve Check



Procedure:

1. Connect oscilloscope to test point TP(FEO).
2. Connect between test point TP(FOK)and GND by lead wire.
3. Turn Power switch on.
4. Put disc (YEDS-18) in and turnd Power switch on again and actuate the focus search. (In case of using SERVICE BOX actuate the focus search when disc table is moving in and out.)
5. Check the oscillosope waveform (S-curve) is symmetrical between A and B. And confirm peak to peak level within 2.4±0.7 Vp-p.

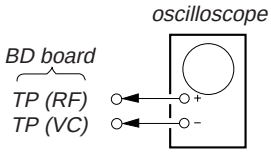
S-curve waveform



6. After check, remove the lead wire connected in step 2.

Note :
- Try to measure several times to make sure than the ratio of A:B or B:A is more than 10:7.
- Take sweep time as long as possible and light up the brightness to obtain best waveform.

RF Level Check



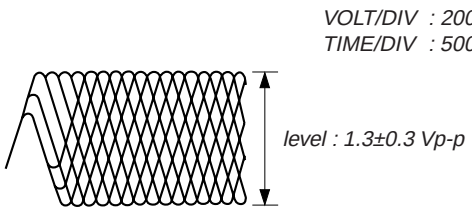
Procedure:

1. Connect oscilloscope to test point TP (RF) on BD board.
2. Turn Power switch on.
3. Put disc (YEDS-18) in and playback.
4. Confirm that oscilloscope waveform is clear and check RF signal level is correct or not.

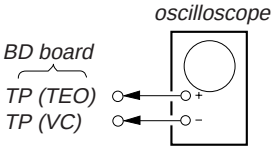
Note :

Clear RF signal waveform means that the shape " ◇ " can be clearly distinguished at the center of the waveform.

RF signal waveform



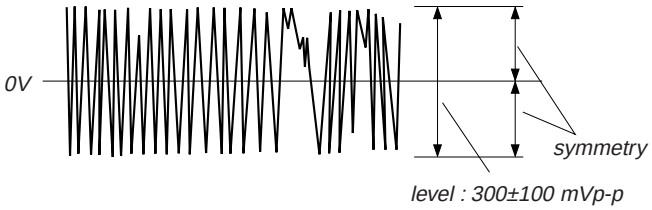
E-F Balance Check



Procedure:

1. Connect oscilloscpe to test point TP (TEO).
2. Turn Power switch on.
3. Connect pin ㉔ of IC60I on the PANEL board to GND with a lead wire.
4. Put disc (YEDS-18) in and playback.
5. Push TIME button.
6. Confirm that the oscilloscope waveform is symmetrical on the top and bottom in relation to 0Vdc, and check this level.

Traverse waveform



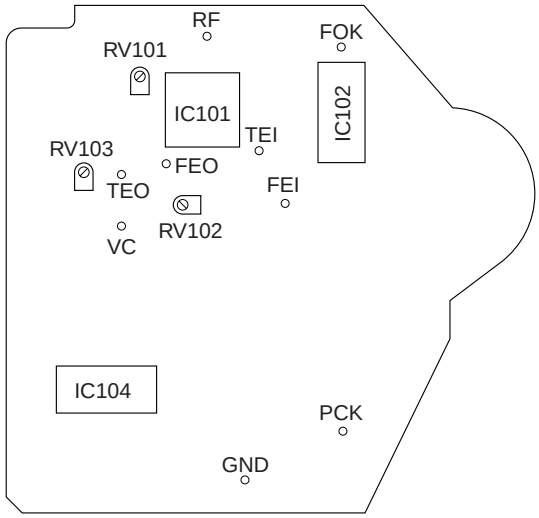
7.Remove the lead wire connected in step 3.

Focus/Tracking Gain Adjustment (RV102, 103)

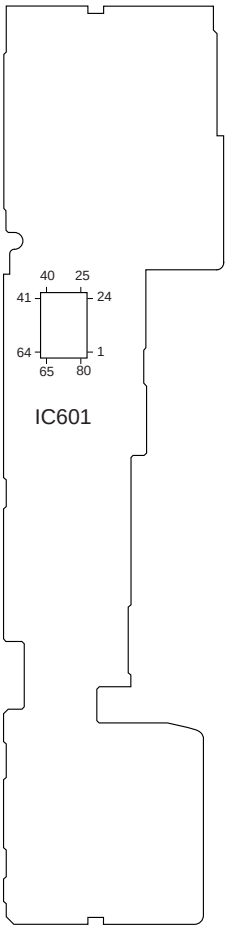
This gain has a margin, so even if it is slightly off.
There is no problem.
Therefore, do not perform this adjustment.
Please note that it should be fixed to mechanical center position when you moved and do not know original position.

Adjustment Location :

[BD BOARD] (Conductor Side)



[PANEL BOARD] (Conductor Side)



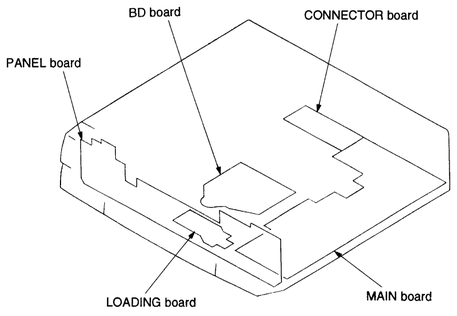
SECTION 5
DIAGRAMS

5-1. IC PIN FUNCTION

• IC601 μPD78044AGF (SYSTEM CONTROL, FL DRIVER)

Pin No.	Pin Name	I/O	Function
1-7	T6-T0	O	FL display grid output
8	VDD	—	+5V power supply
9	CLK	O	Serial clock output to DSP (CXD2507AQ).
10	DATA	O	Serial data output to DSP (CXD2507AQ).
11	—	—	Fixed at Ground.
12	XLAT	O	Serial data latch pulse output to DSP (CXD2507AQ).
13	PRGL	O	Serial data latch pulse output to D/F DAC (PCM1710U).
14	SQCLK	O	Sub code Q data read clock output to DSP (CXD2507AQ).
15	—	—	Not used. (Open)
16	SUBQ	I	Sub code Q data input from DSP (CXD2507AQ).
17	RESET	I	System reset input (“ L ”= Active)
18	INSW	I	S292 (load in switch) input
19	OUTSW	I	S291 (load out switch) input
20	AVSS	—	Ground
21	LDOUT	O	Output for rotating M903 (loading motor) in the loading out direction.
22	LDIN	O	Output for rotating M903 (loading motor) in the loading in direction.
23	ADJ	I	Test mode input. (“ L ”= Stops GFS check)
24	AFADJ	I	Test mode input. Fixed at “H”. (“ L ”= Test mode)
25	MODE	I	Not used. (Fixed at “ H ”.)
26-28	KEY2-KEY0	I	Key AD input
29	AVDD	—	+5V power supply
30	AVREF	—	+5V power supply
31	—	—	Fixed at Ground.
32	—	—	Not used. (Open)
33	VSS	—	Ground
34	X1	I	Clock input (5MHz)
35	X2	O	Clock output (5MHz)
36	BDRST	O	BD reset output
37	BDPOWER	O	BD power ON/OFF output
38	—	—	Not used. (Open)
39	SENS	I	SENS input from DSP (CXD2507AQ).
40	AMUTE	O	Not used. (Open)
41	FSW	O	Focus switch output
42	BSOUT	O	Audio bus output
43	—	—	Not used. (Open)
44	SCOR	I	Sub code sync S0+S1 detection input
45	JOG1	I	JOG input
46	—	—	Not used. (Open)
47	BSIN	I	Audio bus input
48	IC (VPP)	—	Connected to Ground.
49	JOG0	I	JOG input
50, 51	—	—	Not used. (Open)
52	VDD	—	+5V power supply
53-70	S22-S5	O	FL display segment output
71	VLOAD	—	-28V power supply for driving FL display.
72-76	S4-S0	O	FL display segment output
77-80	T10-T7	O	FL display grid output

5-2. CIRCUIT BOARDS LOCATION



• Semiconductor Location

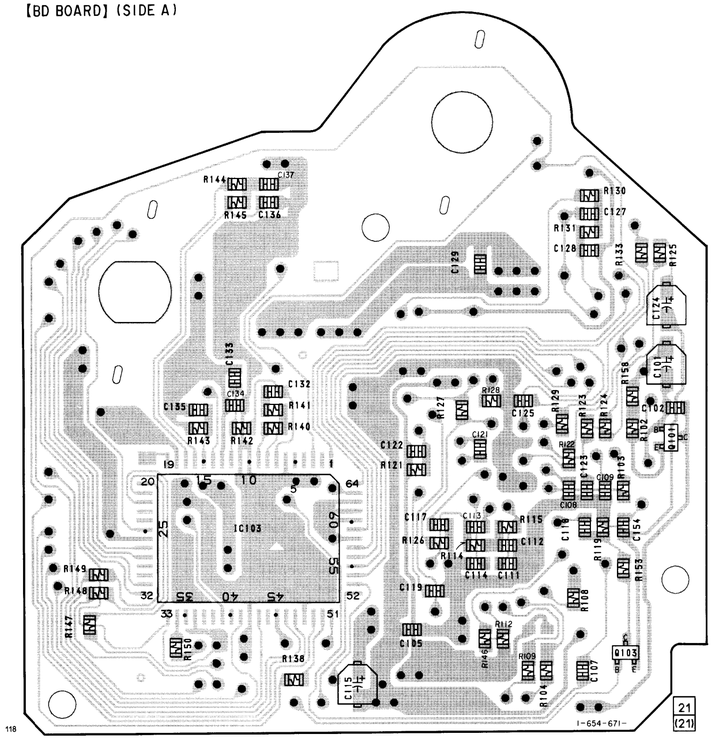
Ref. No.	Location
IC101	E-9
IC102	C-9
IC103	E-3
IC104	F-12
Q101	E-7
Q102	E-8
Q103	F-6

Note :

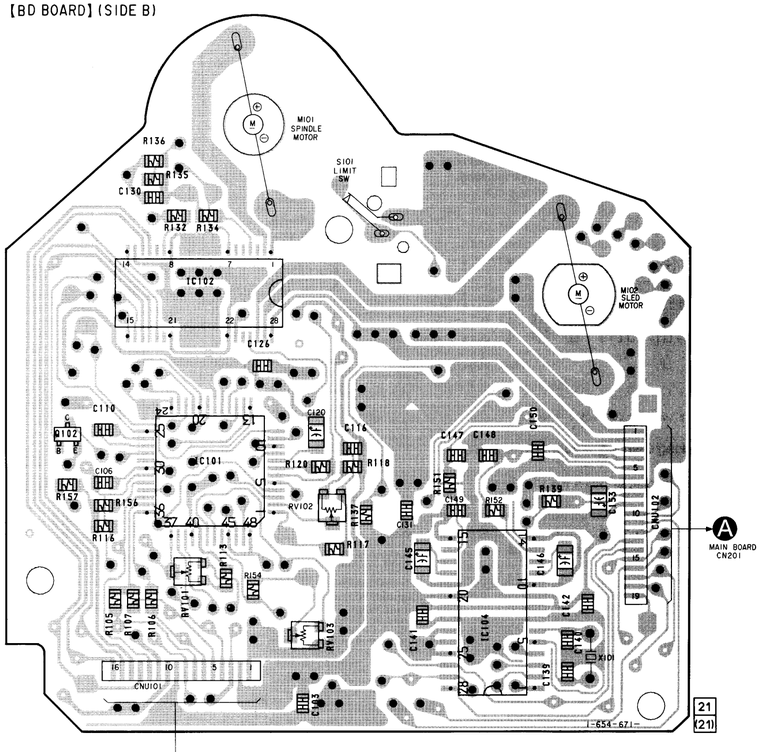
- ● : Through hole.
- ▨ : Pattern on the side which is seen.
  (The other layer's patterns are not indicated.)

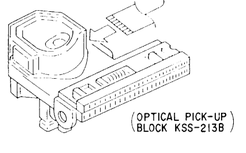
5-3. PRINTED WIRING BOARD — BD SECTION —

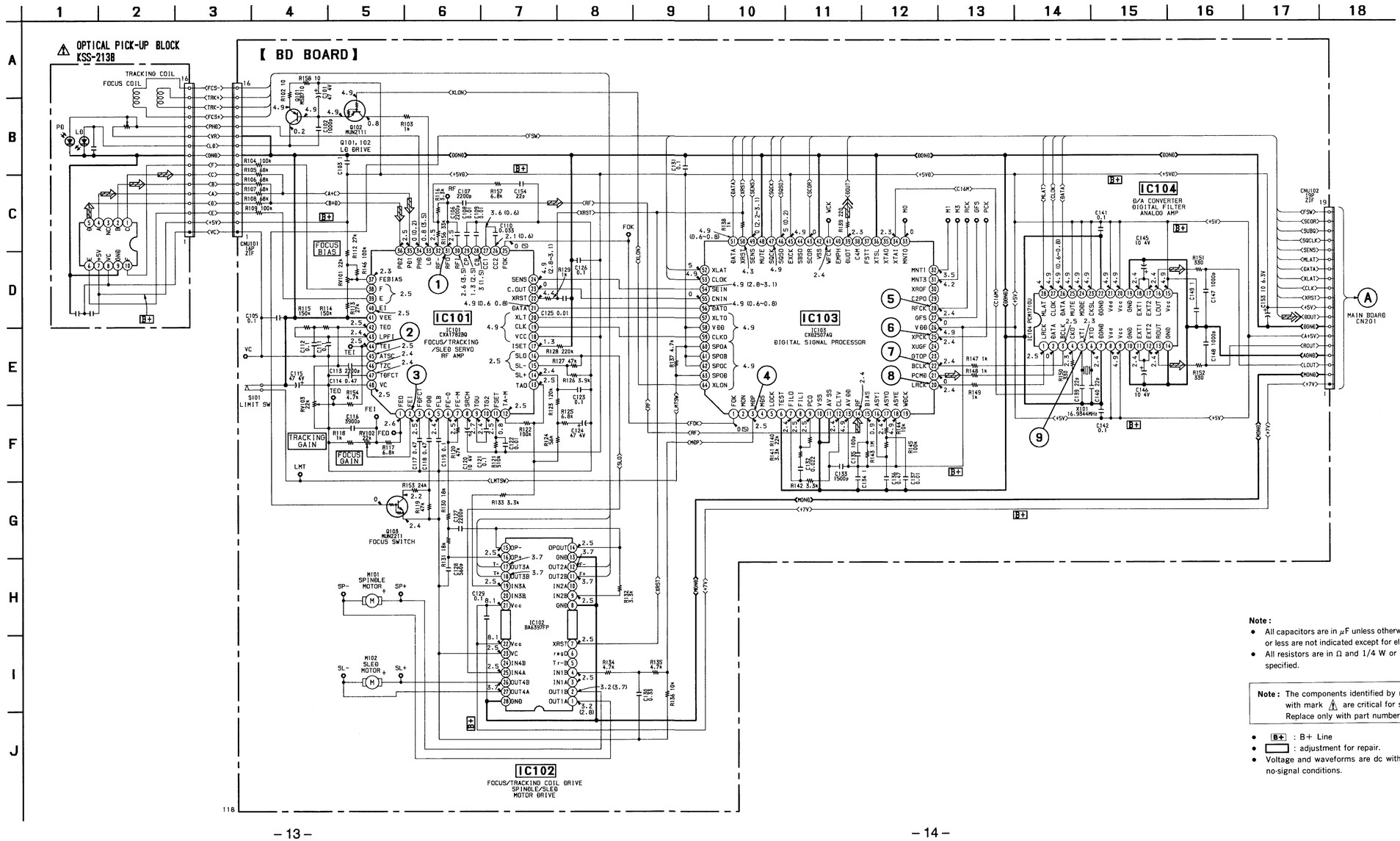
【BD BOARD】(SIDE A)



【BD BOARD】(SIDE B)







• Waveforms

① IC101 (31) pin 1.4Vp-p

② IC101 (44) pin 8mVp-p 0.2ms/DIV

③ IC101 (2) pin 20mVp-p 2ms/DIV

④ IC103 (3) pin 2.4Vp-p 7.5µsec

⑤ IC103 (28) pin 5.1mVp-p 137µsec

⑥ IC103 (25) pin 5.1Vp-p 232.7sec

⑦ IC103 (22) pin 5.1Vp-p 472.7nsec

⑧ IC103 (20) pin 5.1Vp-p 23µsec

⑨ IC104 (5) pin 3Vp-p 16.9344MHz

Note :

- All capacitors are in µF unless otherwise noted. pF : µµF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.

Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- B+ : B+ Line
- ▭ : adjustment for repair.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.

- no mark: STOP
  ( ): PLAY
- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⇨ : CD
  ⇛ : digital out

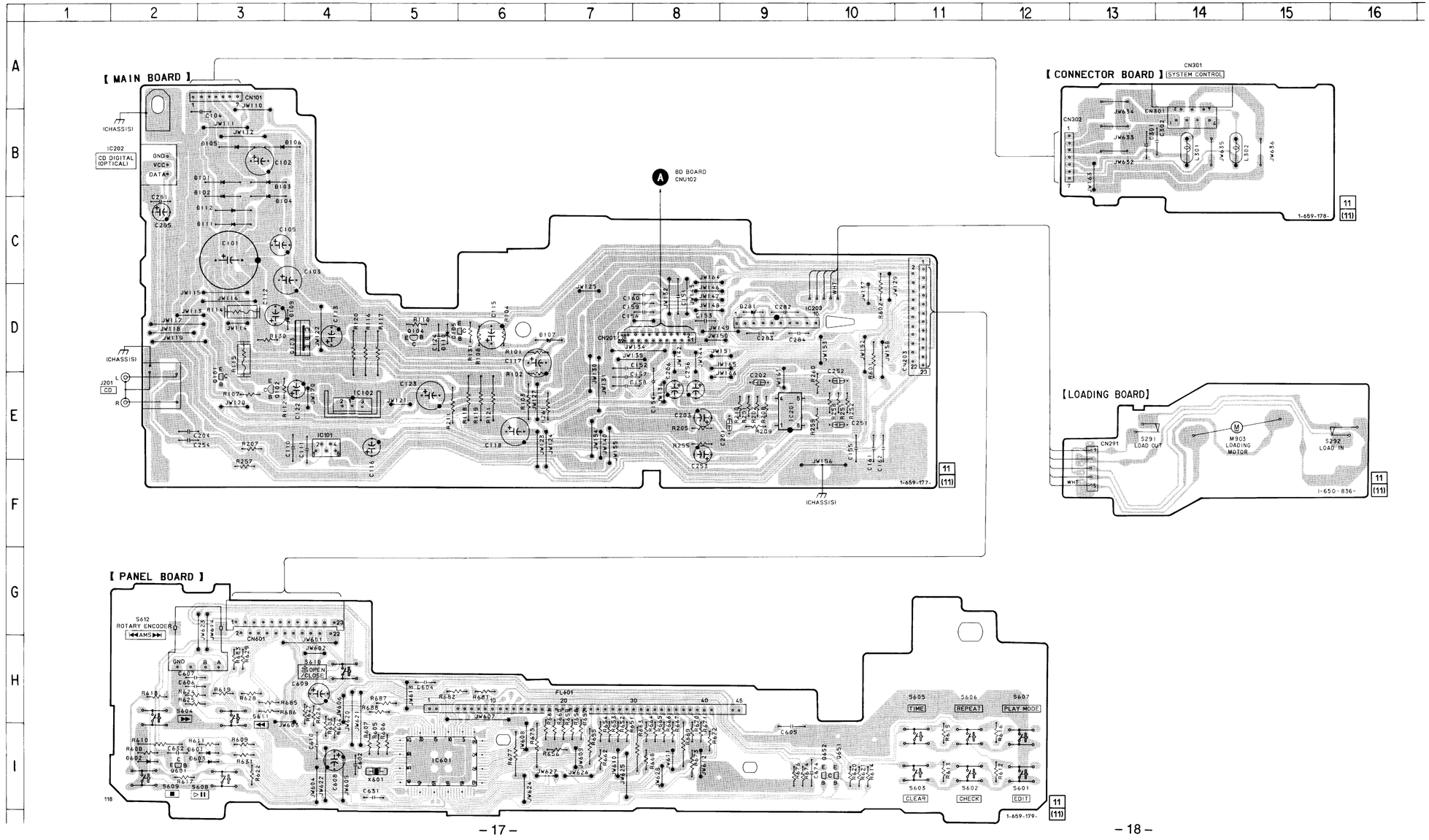
5-5. PRINTED WIRING BOARDS — MAIN SECTION —

• Semiconductor Location

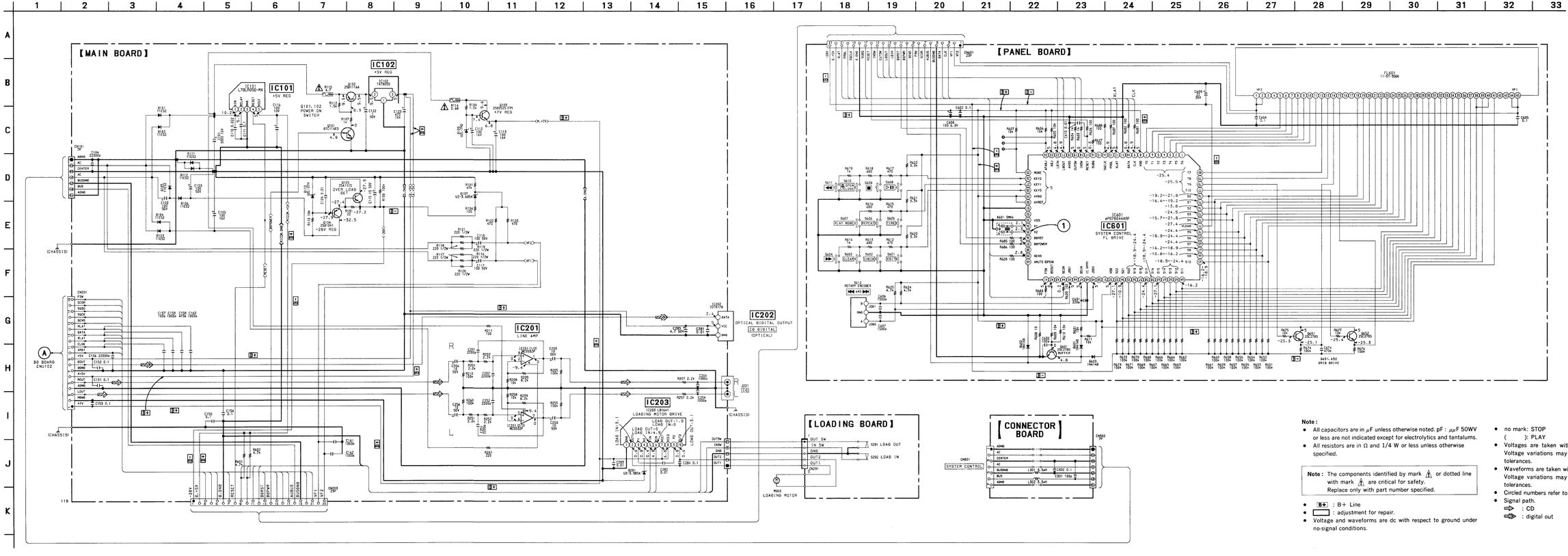
Ref. No.	Location
D101	B-3
D102	B-3
D103	B-3
D104	B-3
D105	B-3
D106	B-3
D107	D-7
D109	D-4
D110	D-5
D111	C-3
D112	C-3
D281	D-9
D601	I-3
D602	I-2
D603	I-3
IC101	E-4
IC102	E-4
IC201	E-9
IC202	B-2
IC203	D-9
IC601	I-5
Q101	E-3
Q102	E-3
Q103	D-4
Q104	D-5
Q105	D-5
Q601	I-2
Q651	I-10
Q652	I-10

Note :

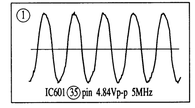
- ● : Through hole.
- ▒ : Pattern on the side which is seen.
  (The other layer's patterns are not indicated.)



5-6. SCHEMATIC DIAGRAM — MAIN SECTION — • Refer to page 23 for IC Block Diagrams.



• Waveform



Note :

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise specified.

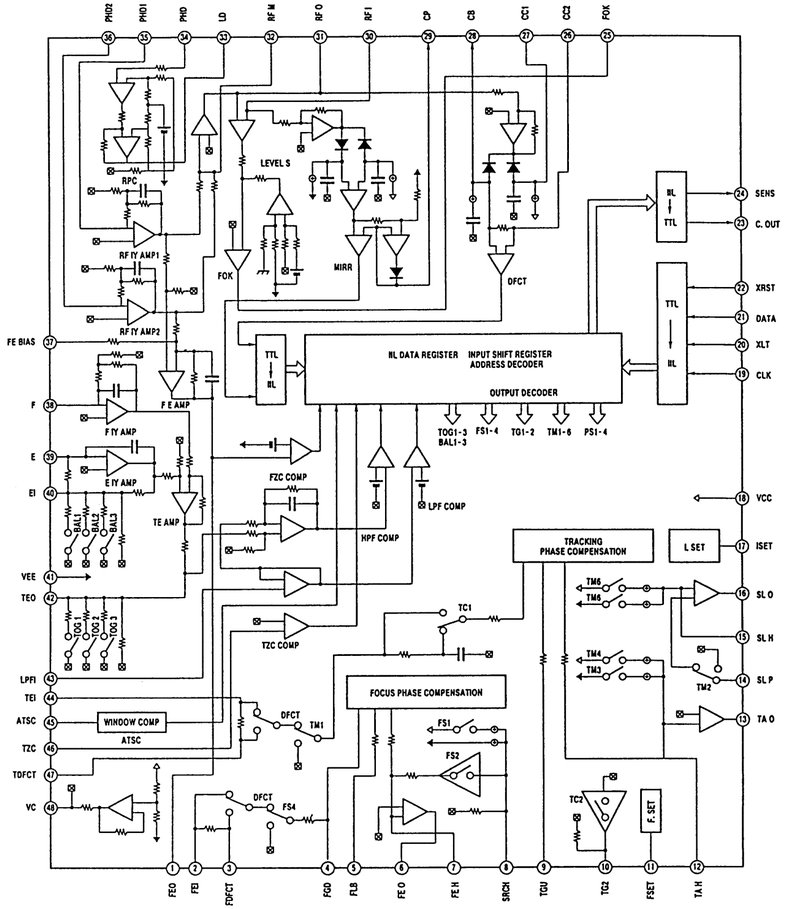
Note : The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.

- B+ : B+ Line
- ▭ : adjustment for repair.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.

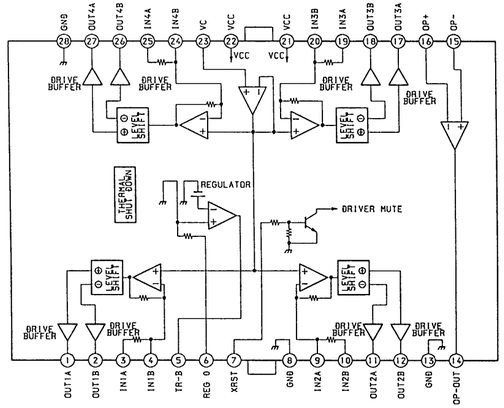
- no mark: STOP
  ( ): PLAY
- Voltages are taken with a VOM (Input Impedance 10MΩ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  ⇨ : CD
  ⇨ : digital out

• **IC Block Diagrams**

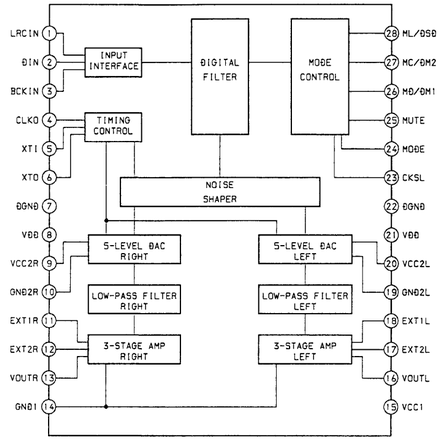
IC101 CXA1782BQ (BD Board)



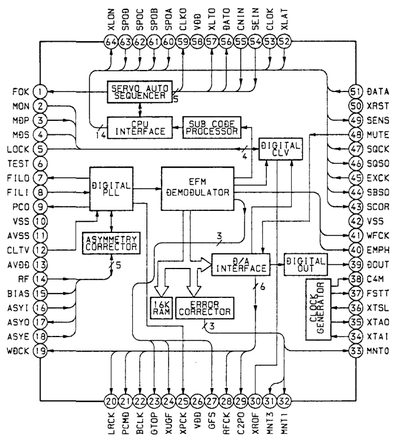
IC102 BA6397FP



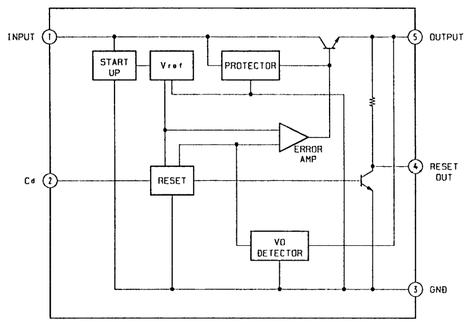
IC104 PCM1710U



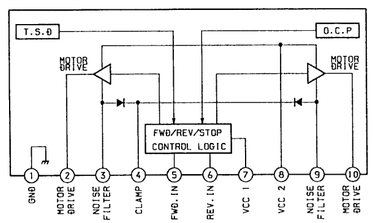
IC103 CXD2507AR



IC101 L78LR05D (Main Board)



IC203 LB1641



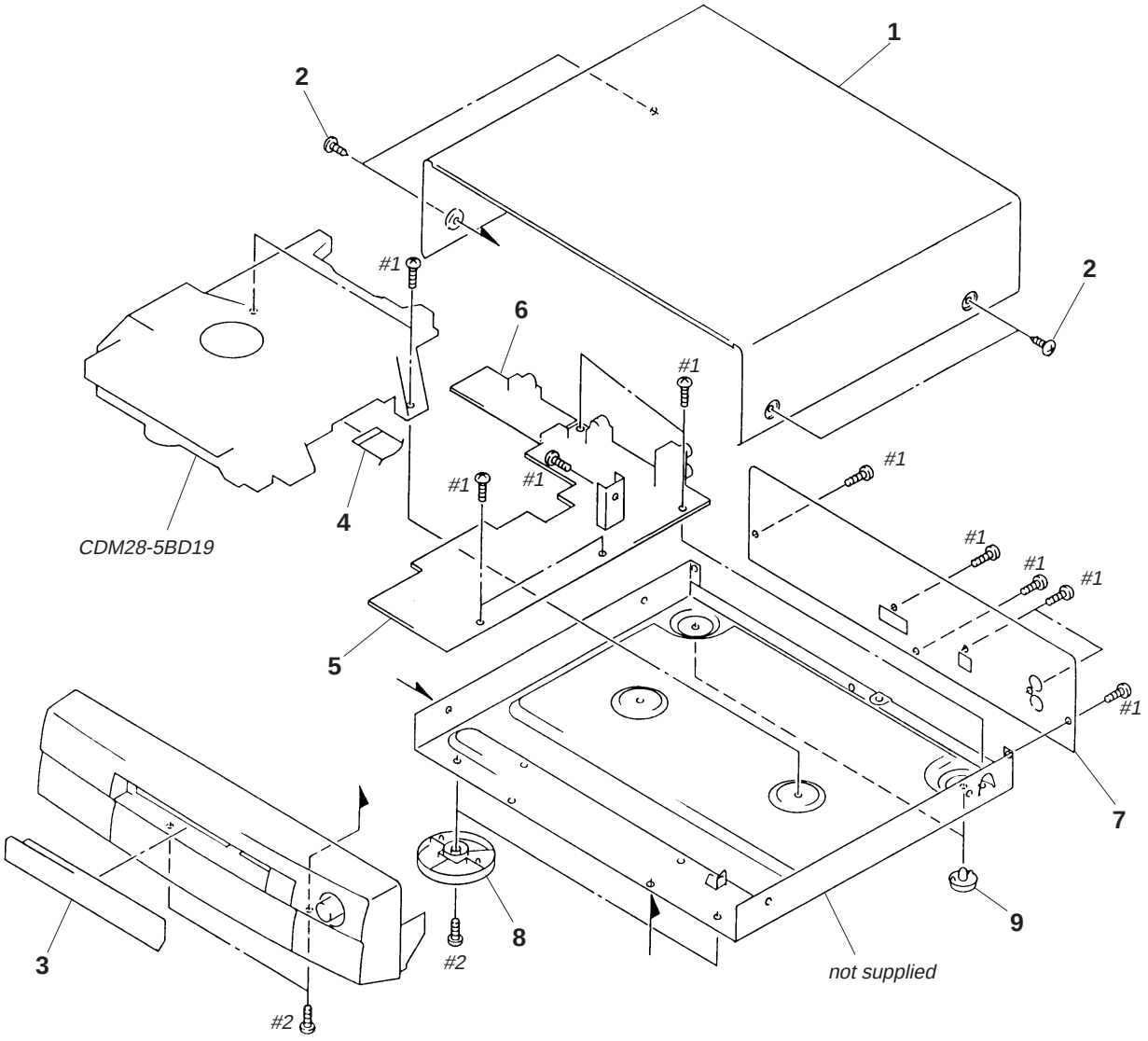
SECTION 6
EXPLODED VIEWS

NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Abbreviation
  EA : Saudi Arabia model
  TH : Thai model
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- Color Indication of Appearance Parts
  Example :
  KNOB, BALANCE (WHITE) ... (RED)
  ↑ ↑
  Parts Color Cabinet's Color
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

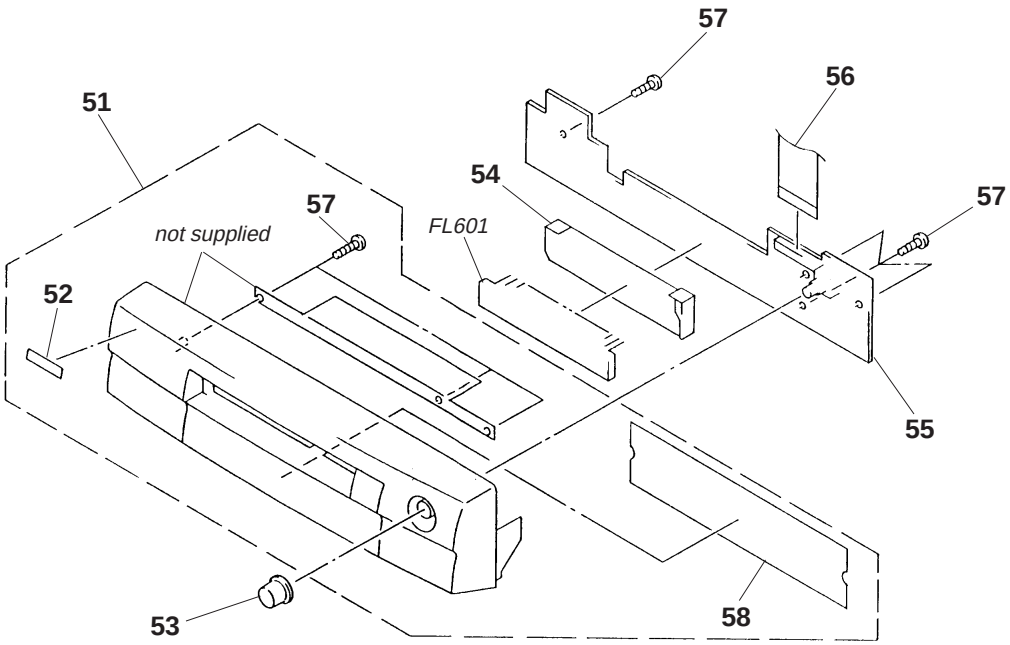
6-1. CHASSIS SECTION



Ref. No.	Part No.	Description	Remark
* 1	4-970-927-21	CASE (BLACK)	
* 1	4-970-927-41	CASE (SILVER)	
2	3-363-099-01	SCREW (CASE 3 TP2)	
3	4-977-986-01	PANEL, LOADING (E,EA,TH,AEP:SILVER)	
3	4-977-986-21	PANEL, LOADING (AEP,UK:BLACK)	
4	1-769-621-11	WIRE (FLAT TYPE) (19 CORE)	
* 5	A-4673-912-A	MAIN BOARD, COMPLETE (TH)	
* 5	A-4673-915-A	MAIN BOARD, COMPLETE (E,EA)	
* 5	A-4673-918-A	MAIN BOARD, COMPLETE (AEP,UK)	

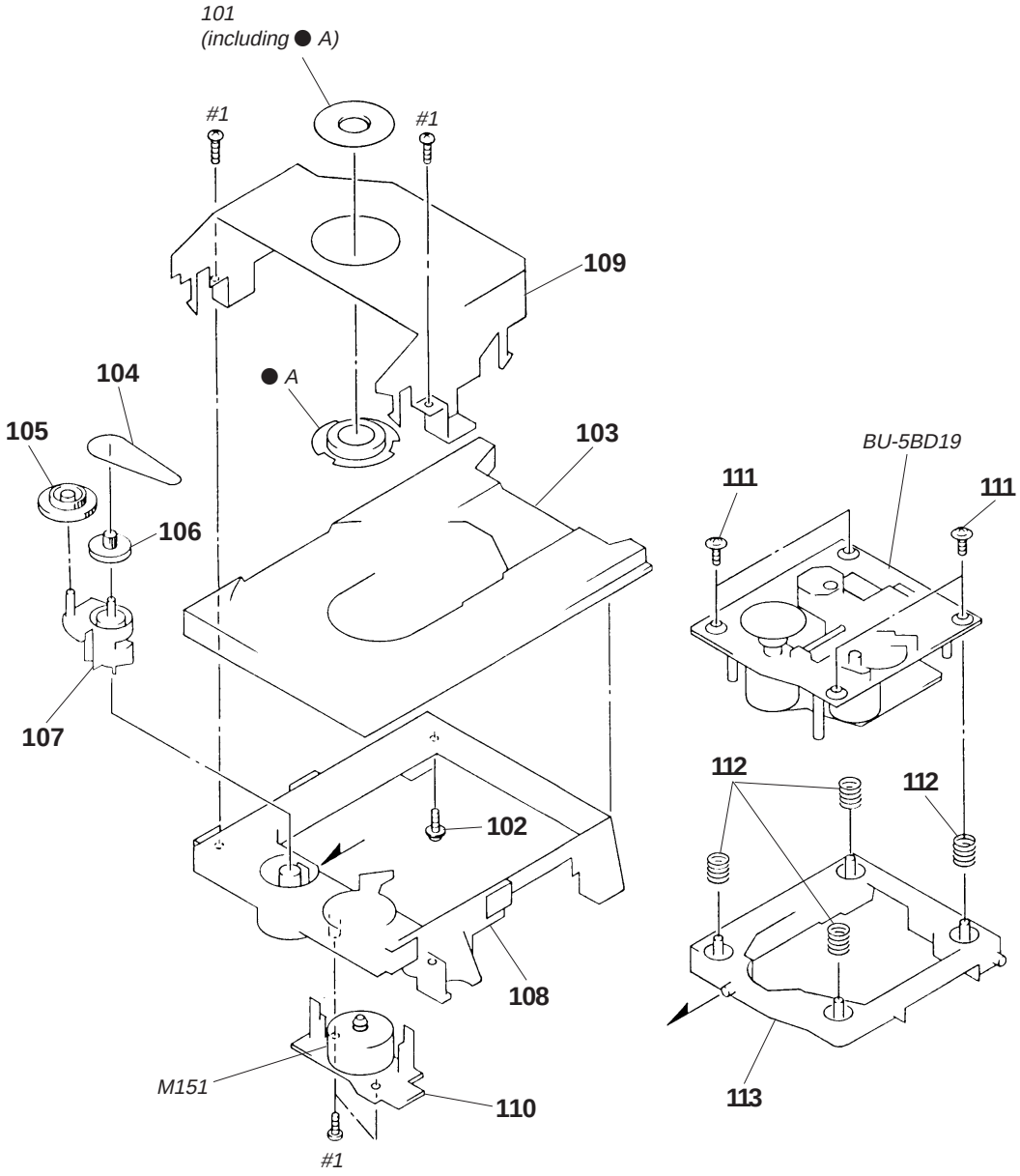
Ref. No.	Part No.	Description	Remark
* 6	1-659-178-11	CONNECTOR BOARD	
* 7	4-977-983-01	PANEL, BACK (E)	
* 7	4-977-983-11	PANEL, BACK (AEP,UK:BLACK,AEP:SILVER) (Made in France)	
* 7	4-977-983-21	PANEL, BACK (EA)	
* 7	4-977-983-31	PANEL, BACK (TH)	
* 7	4-977-983-41	PANEL, BACK (AEP:SILVER) (Made in Malaysia)	
8	4-977-699-11	LEG (F)	
9	4-965-822-01	FOOT	

6-2. FRONT PANEL SECTION



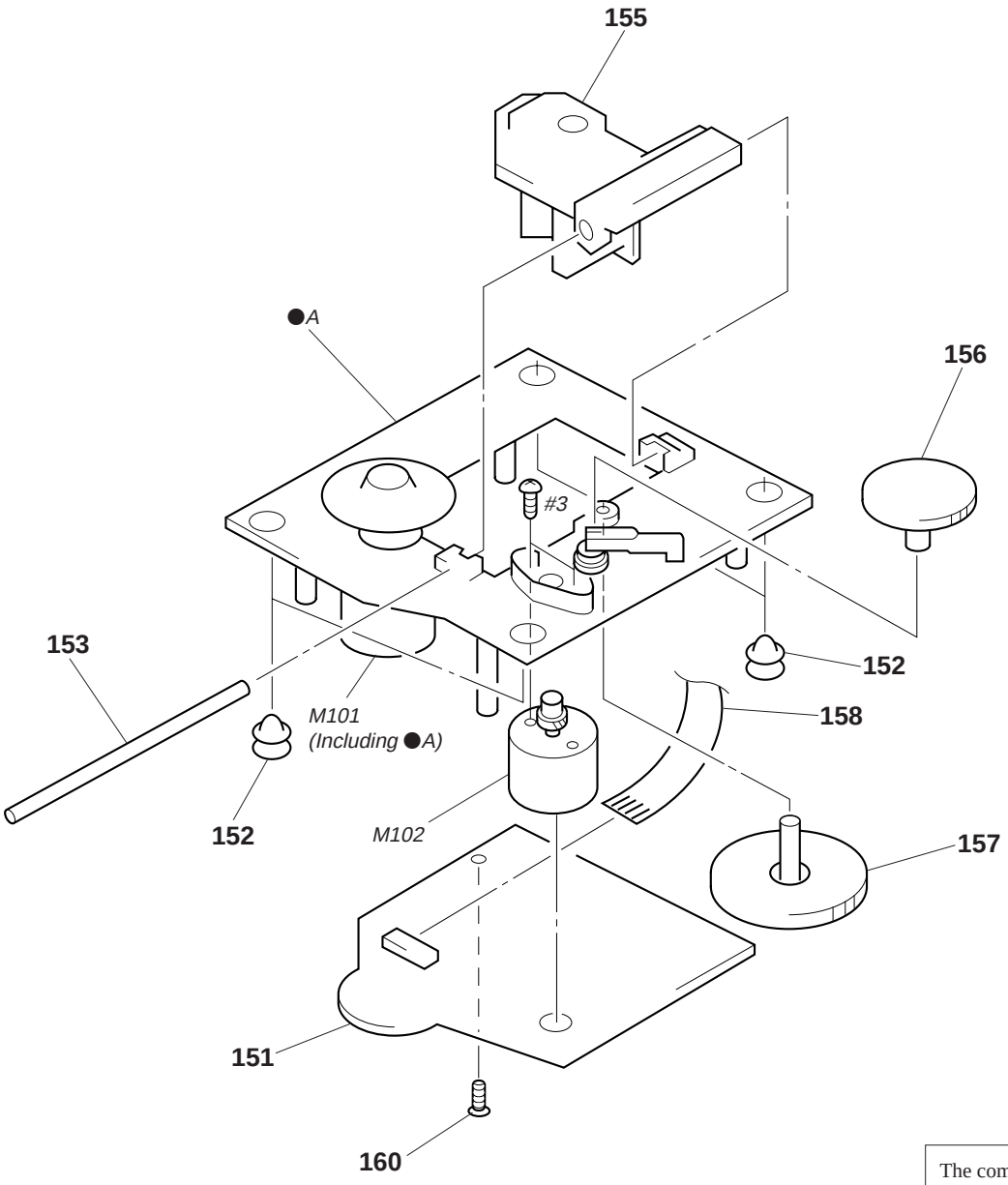
Ref. No.	Part No.	Description	Remark
51	X-4946-590-1	PANEL ASSY, FRONT (E,EA,AEP:SILVER) (Made in Malaysia)	
51	X-4946-832-1	PANEL ASSY (B), FRONT (AEP,UK:BLACK)	
51	X-4946-852-1	PANEL ASSY (S), FRONT (TH,AEP:SILVER) (Made in France)	
52	4-962-708-11	EMBLEM (4-A), SONY	
53	4-977-987-01	KNOB (JOG) (SILVER)	
53	4-977-987-11	KNOB (JOG) (BLACK)	
54	4-979-797-01	HOLDER (FL)	
* 55	A-4673-913-A	PANEL BOARD, COMPLETE (TH)	
* 55	A-4673-916-A	PANEL BOARD, COMPLETE (E,EA)	
* 55	A-4673-919-A	PANEL BOARD, COMPLETE (AEP,UK)	
56	1-776-237-11	WIRE (FLAT TYPE) (23 CORE)	
57	4-951-620-01	SCREW (2.6X8), +BVTP	
* 58	4-977-985-01	SHEET (FL)	
FL601	1-517-369-11	INDICATOR TUBE, FLUORESCENT	

6-3. CD MECHANISM SECTION (CDM28-5BD19)



Ref. No.	Part No.	Description	Remark
101	1-452-719-11	MAGNET ASSY	
102	4-917-583-21	BRACKET, YOKE	
103	4-960-836-01	TABLE, DISC	
104	4-927-649-01	BELT	
105	4-960-842-01	GEAR (P)	
106	4-960-841-01	PULLEY (S)	
* 107	4-960-839-01	CAM	
108	4-960-838-03	BASE (MD)	
109	4-960-835-01	HOLDER (M)	
* 110	1-650-836-11	LOADING BOARD	
111	4-933-134-01	SCREW (+PTPWH M2.6X6)	
112	4-959-996-01	SPRING (932), COMPRESSION	
113	4-960-834-01	HOLDER (BU)	
M151	A-4604-363-A	MOTOR (L) ASSY (LOADING)	

6-4. BASE UNIT SECTION (BU-5BD19)



The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
* 151	A-4673-402-A	BD BOARD, COMPLETE	
152	4-951-940-01	INSULATOR (BU)	
153	4-917-565-01	SHAFT, SLED	
⚠ 155	8-848-367-11	PICK-UP, OPTICAL KSS-213B/K-RP	
156	4-917-567-01	GEAR (M)	
157	4-917-564-01	GEAR (P), FLATNESS	
158	1-769-069-11	WIRE (FLAT TYPE) (16 CORE)	
160	4-951-620-01	SCREW (2.6X8), +BVTP	
M101	X-4917-523-3	BASE (OUTSERT) ASSY (SPINDLE)	
M102	X-4917-504-1	MOTOR ASSY (SLED)	

BD

SECTION 7
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms.
  METAL:Metal-film resistor.
  METAL OXIDE: Metal oxide-film resistor.
  F:nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : µ, for example:
  uA.. : µA.. uPA.. : µPA..
  uPB.. : µPB.. uPC.. : µPC.. uPD.. : µPD..
- CAPACITORS
  uF : µF
- COILS
  uH : µH

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

- Abbreviation
  EA : Saudi Arabia model
  TH : Thai model

Ref. No.	Part No.	Description			Remark
*	A-4673-402-A	BD BOARD, COMPLETE			
		**********			
		< CAPACITOR >			
C101	1-126-607-11	ELECT CHIP	47uF	20%	4V
C102	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C103	1-164-346-11	CERAMIC CHIP	1uF		16V
C105	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C106	1-164-695-11	CERAMIC CHIP	0.0022uF	5%	50V
C107	1-164-695-11	CERAMIC CHIP	0.0022uF	5%	50V
C108	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C109	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C110	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V
C111	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C112	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C113	1-164-695-11	CERAMIC CHIP	0.0022uF	5%	50V
C114	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C115	1-126-607-11	ELECT CHIP	47uF	20%	4V
C116	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C117	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C118	1-107-823-11	CERAMIC CHIP	0.47uF	10%	16V
C119	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C120	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C121	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C122	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C123	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C124	1-126-607-11	ELECT CHIP	47uF	20%	4V
C125	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C126	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C127	1-164-695-11	CERAMIC CHIP	0.0022uF	5%	50V
C128	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C129	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C130	1-164-336-11	CERAMIC CHIP	0.33uF		25V
C131	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C132	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C133	1-163-145-00	CERAMIC CHIP	0.0015uF	5%	50V
C134	1-164-346-11	CERAMIC CHIP	1uF		16V
C135	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C136	1-164-005-11	CERAMIC CHIP	0.47uF		25V
C137	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C139	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C140	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
C141	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C142	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C145	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C146	1-135-201-11	TANTALUM CHIP	10uF	20%	4V
C147	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C148	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C149	1-164-346-11	CERAMIC CHIP	1uF		16V
C153	1-135-259-11	TANTAL. CHIP	10uF	20%	6.3V
C154	1-163-235-11	CERAMIC CHIP	22PF	5%	50V
		< CONNECTOR >			
CNU101	1-770-014-11	CONNECTOR, FFC/FPC 16P			
CNU102	1-770-013-11	CONNECTOR, FFC/FPC 19P			
		< IC >			
IC101	8-752-069-56	IC CXA1782BQ			
IC102	8-759-291-06	IC BA6397FP			
IC103	8-752-372-94	IC CXD2507AQ			
IC104	8-759-185-29	IC PCM1710U-B			
		< TRANSISTOR >			
Q101	8-729-010-08	TRANSISTOR MSB710-R			
Q102	8-729-424-08	TRANSISTOR UN2111			
Q103	8-729-421-22	TRANSISTOR UN2211			
		< RESISTOR >			
R102	1-216-001-00	METAL CHIP	10	5%	1/10W
R103	1-216-049-11	METAL GLAZE	1K	5%	1/10W
R104	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R105-108					
	1-216-093-00	METAL CHIP	68K	5%	1/10W
R109	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R112	1-216-083-00	METAL CHIP	27K	5%	1/10W
R113	1-216-083-00	METAL CHIP	27K	5%	1/10W
R114	1-216-101-00	METAL CHIP	150K	5%	1/10W
R115	1-216-101-00	METAL CHIP	150K	5%	1/10W
R116	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R117	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R118	1-216-049-11	METAL GLAZE	1K	5%	1/10W
R119	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R120	1-216-089-00	METAL GLAZE	47K	5%	1/10W
R121	1-216-114-00	METAL GLAZE	510K	5%	1/10W
R122	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R123	1-216-099-00	METAL CHIP	120K	5%	1/10W
R124	1-216-091-00	METAL CHIP	56K	5%	1/10W
R125	1-216-069-00	METAL CHIP	6.8K	5%	1/10W

Ref. No.	Part No.	Description				Remark
R126	1-216-063-00	METAL GLAZE	3.9K	5%	1/10W	
R127	1-216-089-00	METAL GLAZE	47K	5%	1/10W	
R128	1-216-105-00	METAL GLAZE	220K	5%	1/10W	
R129	1-216-049-11	METAL GLAZE	1K	5%	1/10W	
R130	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R131	1-216-079-00	METAL CHIP	18K	5%	1/10W	
R132	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R133	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R134	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R135	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R136	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R137	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R138	1-216-049-11	METAL GLAZE	1K	5%	1/10W	
R139	1-216-033-00	METAL CHIP	220	5%	1/10W	
R140	1-216-081-00	METAL CHIP	22K	5%	1/10W	
R141	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R142	1-216-061-00	METAL CHIP	3.3K	5%	1/10W	
R143	1-216-121-00	METAL GLAZE	1M	5%	1/10W	
R144	1-216-073-00	METAL CHIP	10K	5%	1/10W	
R145	1-216-097-00	METAL GLAZE	100K	5%	1/10W	
R146	1-216-097-00	METAL GLAZE	100K	5%	1/10W	
R147-149						
	1-216-049-11	METAL GLAZE	1K	5%	1/10W	
R150-152						
	1-216-037-00	METAL CHIP	330	5%	1/10W	
R153	1-216-082-00	METAL GLAZE	24K	5%	1/10W	
R154	1-216-065-00	METAL CHIP	4.7K	5%	1/10W	
R156	1-216-085-00	METAL CHIP	33K	5%	1/10W	
R157	1-216-069-00	METAL CHIP	6.8K	5%	1/10W	
R158	1-216-001-00	METAL CHIP	10	5%	1/10W	
		< VARIABLE RESISTOR >				
RV101	1-241-396-11	RES, ADJ, METAL GLAZE 22K				
RV102	1-241-396-11	RES, ADJ, METAL GLAZE 22K				
RV103	1-241-396-11	RES, ADJ, METAL GLAZE 22K				
		< SWITCH >				
S101	1-572-085-11	SWITCH, LEAF (LIMIT SW)				
		< VIBRATOR >				
X101	1-579-280-11	VIBRATOR, CRYSTAL (16.9344MHz)				
**********						
*	1-659-178-11	CONNECTOR BOARD				
		**********				
		< CAPACITOR >				
C301	1-162-282-31	CERAMIC	100PF	10%	50V	
C302	1-164-159-21	CERAMIC	0.1uF		50V	
		< CONNECTOR >				
CN301	1-770-158-21	HOUSING, CONNECTOR 7P (SYSTEM CONTROL)				
CN302	1-770-031-11	CONNECTOR, BOARD TO BOARD 7P				
		< COIL >				
L301	1-410-464-11	INDUCTOR 3.3uH				
L302	1-410-464-11	INDUCTOR 3.3uH				
**********						
*	1-650-836-11	LOADING BOARD				
		**********				
		< CONNECTOR >				
* CN291	1-568-943-11	PIN, CONNECTOR 5P				
		< SWITCH >				
S291	1-572-086-11	SWITCH, LEAF (LOAD OUT)				
S292	1-572-086-11	SWITCH, LEAF (LOAD IN)				
**********						
*	A-4673-912-A	MAIN BOARD, COMPLETE (TH)				
*	A-4673-915-A	MAIN BOARD, COMPLETE (E,EA)				
*	A-4673-918-A	MAIN BOARD, COMPLETE (AEP,UK)				
		**********				
	1-537-770-21	TERMINAL BOARD, GROUND				
	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S				
		< CAPACITOR >				
C101	1-126-936-11	ELECT	3300uF	20%	16V	
C102	1-126-968-11	ELECT	100uF	20%	50V	
C103	1-126-968-11	ELECT	100uF	20%	50V	
C104	1-161-494-00	CERAMIC	0.022uF		25V	
C105	1-126-933-11	ELECT	100uF	20%	16V	
C110	1-161-494-00	CERAMIC	0.022uF		25V	
C111	1-164-159-21	CERAMIC	0.1uF		50V	
C112	1-126-933-11	ELECT	100uF	20%	16V	
C113	1-126-933-11	ELECT	100uF	20%	16V	
C115	1-126-964-11	ELECT	10uF	20%	50V	
C116	1-126-933-11	ELECT	100uF	20%	10V	
C117	1-126-968-11	ELECT	100uF	20%	50V	
C118	1-126-968-11	ELECT	100uF	20%	50V	
C122	1-124-903-11	ELECT	1uF	20%	50V	
C123	1-126-925-11	ELECT	470uF	20%	10V	
C124	1-162-306-11	CERAMIC	0.01uF	30%	16V	
C151-155						
	1-164-159-21	CERAMIC	0.1uF		50V	
C156	1-161-494-00	CERAMIC	0.022uF		25V	
C157	1-162-282-31	CERAMIC	100PF	10%	50V	
C158	1-162-290-31	CERAMIC	470PF	10%	50V	
C159-162						
	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C201	1-130-475-00	MYLAR	0.0022uF	5%	50V	
C202	1-130-475-00	MYLAR	0.0022uF	5%	50V	
C203	1-126-964-11	ELECT	10uF	20%	50V	
C204	1-162-294-31	CERAMIC	0.001uF	10%	50V	

MAIN PANEL

Ref. No.	Part No.	Description				Remark
C206	1-126-964-11	ELECT	10uF	20%	50V	
C251	1-130-475-00	MYLAR	0.0022uF	5%	50V	
C252	1-130-475-00	MYLAR	0.0022uF	5%	50V	
C253	1-126-964-11	ELECT	10uF	20%	50V	
C254	1-162-294-31	CERAMIC	0.001uF	10%	50V	
C256	1-126-964-11	ELECT	10uF	20%	50V	
C281-283						
	1-162-306-11	CERAMIC	0.01uF	30%	16V	
C284	1-164-159-21	CERAMIC	0.1uF		50V	
C285	1-126-963-11	ELECT	4.7uF	20%	50V	
		< CONNECTOR >				
* CN101	1-691-406-11	CONNECTOR, BOARD TO BOARD 7P				
CN201	1-770-167-11	CONNECTOR, FFC/FPC 19P				
* CN203	1-568-839-11	SOCKET, CONNECTOR 23P				
		< DIODE >				
D101	8-719-200-82	DIODE	11ES2			
D102	8-719-200-82	DIODE	11ES2			
D103	8-719-200-82	DIODE	11ES2			
D104	8-719-200-82	DIODE	11ES2			
D105	8-719-200-82	DIODE	11ES2			
D106	8-719-200-82	DIODE	11ES2			
D107	8-719-982-03	DIODE	MTZJ-3.6A			
D109	8-719-933-50	DIODE	HZS7C2L			
D110	8-719-982-19	DIODE	MTZJ-30A			
D111	8-719-200-82	DIODE	11ES2			
D112	8-719-200-82	DIODE	11ES2			
D281	8-719-109-71	DIODE	RD3.9ES-B1			
		< IC >				
IC101	8-759-805-37	IC	L78LR05D			
IC102	8-759-231-53	IC	TA7805S			
IC201	8-759-900-72	IC	NE5532P			
IC202	8-749-923-04	IC	TOTX178 (CD DIGITAL,OPTICAL)			
IC203	8-759-822-09	IC	LB1641			
		< JACK >				
J201	1-770-272-11	JACK, PIN 2P (CD)				
		< TRANSISTOR >				
Q101	8-729-900-80	TRANSISTOR	DTC114ES			
Q102	8-729-118-00	TRANSISTOR	2SB1116-L			
Q103	8-729-030-18	TRANSISTOR	2SD2525			
Q104	8-729-019-64	TRANSISTOR	2SB1041			
Q105	8-729-119-76	TRANSISTOR	2SA1175-HFE			
		< RESISTOR >				
R101	1-249-437-11	CARBON	47K	5%	1/4W	
R102	1-249-413-11	CARBON	470	5%	1/4W	
R103	1-249-413-11	CARBON	470	5%	1/4W	
R104	1-247-807-11	CARBON	100	5%	1/4W	
R107	1-249-417-11	CARBON	1K	5%	1/4W	

Ref. No.	Part No.	Description				Remark
R108	1-249-441-11	CARBON	100K	5%	1/4W	
R110	1-249-429-11	CARBON	10K	5%	1/4W	
R112	1-249-419-11	CARBON	1.5K	5%	1/4W	
⚠ R114	1-219-139-11	FUSIBLE	0.68	10%	1/4W	F
⚠ R115	1-217-641-00	FUSIBLE	4.7	5%	1/4W	F
R116-121						
	1-260-091-11	CARBON	220	5%	1/2W	
R130	1-249-417-11	CARBON	1K	5%	1/4W	
R131	1-247-791-00	CARBON	22	5%	1/4W	
R201	1-249-421-11	CARBON	2.2K	5%	1/4W	
R202	1-249-421-11	CARBON	2.2K	5%	1/4W	
R205	1-249-441-11	CARBON	100K	5%	1/4W	
R207	1-249-421-11	CARBON	2.2K	5%	1/4W	
R208	1-249-429-11	CARBON	10K	5%	1/4W	
R209	1-249-428-11	CARBON	8.2K	5%	1/4W	
R210	1-249-441-11	CARBON	100K	5%	1/4W	
R211	1-247-807-11	CARBON	100	5%	1/4W	
R251	1-249-421-11	CARBON	2.2K	5%	1/4W	
R252	1-249-421-11	CARBON	2.2K	5%	1/4W	
R255	1-249-441-11	CARBON	100K	5%	1/4W	
R257	1-249-421-11	CARBON	2.2K	5%	1/4W	
R258	1-249-429-11	CARBON	10K	5%	1/4W	
R259	1-249-428-11	CARBON	8.2K	5%	1/4W	
R260	1-249-441-11	CARBON	100K	5%	1/4W	
R261	1-247-815-00	CARBON	220	5%	1/4W	
R601	1-249-425-11	CARBON	4.7K	5%	1/4W	
R602	1-249-425-11	CARBON	4.7K	5%	1/4W	
**********						
*	A-4673-913-A	PANEL BOARD, COMPLETE (TH)				
*	A-4673-916-A	PANEL BOARD, COMPLETE (E,EA)				
*	A-4673-919-A	PANEL BOARD, COMPLETE (AEP,UK)				
		**********				
*	4-979-797-01	HOLDER (FL)				
		< CAPACITOR >				
C602	1-164-159-21	CERAMIC	0.1uF		50V	
C604	1-164-159-21	CERAMIC	0.1uF		50V	
C605	1-164-159-21	CERAMIC	0.1uF		50V	
C606	1-162-301-11	CERAMIC	0.0015uF	30%	16V	
C607	1-162-301-11	CERAMIC	0.0015uF	30%	16V	
C608	1-126-177-11	ELECT	100uF	20%	10V	
C609	1-124-916-11	ELECT	22uF	20%	63V	
C610	1-162-306-11	CERAMIC	0.01uF	30%	16V	
C631	1-162-286-21	CERAMIC	220PF	10%	50V	
C632	1-162-282-31	CERAMIC	100PF	10%	50V	
C674	1-162-290-31	CERAMIC	470PF	10%	50V	
		< CONNECTOR >				
* CN601	1-568-865-11	SOCKET, CONNECTOR 23P				

The components identified by mark ⚠ or dotted line with mark. ⚠ are critical for safety.
Replace only with part number specified.

Ref. No.	Part No.	Description	Remark
		< DIODE >	
D601	8-719-815-85	DIODE 1S1585	
D602	8-719-815-85	DIODE 1S1585	
D603	8-719-815-85	DIODE 1S1585	
		< FLUORESCENT INDICATOR TUBE >	
FL601	1-517-369-11	INDICATOR TUBE, FLUORESCENT	
		< IC >	
IC601	8-759-340-60	IC uPD78044AGF-091-3B9	
		< TRANSISTOR >	
Q601	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q651	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q652	8-729-119-78	TRANSISTOR 2SC2785-HFE	
		< RESISTOR >	
R603	1-249-417-11	CARBON 1K 5% 1/4W	
R604	1-249-417-11	CARBON 1K 5% 1/4W	
R605-607			
	1-249-429-11	CARBON 10K 5% 1/4W	
R608	1-249-393-11	CARBON 10 5% 1/4W	
R609-611			
	1-249-429-11	CARBON 10K 5% 1/4W	
R612	1-249-413-11	CARBON 470 5% 1/4W	
R613	1-249-415-11	CARBON 680 5% 1/4W	
R614	1-249-417-11	CARBON 1K 5% 1/4W	
R615	1-249-413-11	CARBON 470 5% 1/4W	
R616	1-249-415-11	CARBON 680 5% 1/4W	
R617	1-249-413-11	CARBON 470 5% 1/4W	
R618	1-249-415-11	CARBON 680 5% 1/4W	
R619	1-249-417-11	CARBON 1K 5% 1/4W	
R620-622			
	1-249-423-11	CARBON 3.3K 5% 1/4W	
R624	1-249-425-11	CARBON 4.7K 5% 1/4W	
R625	1-249-425-11	CARBON 4.7K 5% 1/4W	
R626-629			
	1-247-807-11	CARBON 100 5% 1/4W	
R631	1-249-429-11	CARBON 10K 5% 1/4W	
R651-674			
	1-249-441-11	CARBON 100K 5% 1/4W	
R675	1-249-429-11	CARBON 10K 5% 1/4W	
R676	1-249-441-11	CARBON 100K 5% 1/4W	
R677	1-249-429-11	CARBON 10K 5% 1/4W	
R681-683			
	1-247-807-11	CARBON 100 5% 1/4W	
R685-688			
	1-247-807-11	CARBON 100 5% 1/4W	

Ref. No.	Part No.	Description	Remark
		< SWITCH >	
S601	1-554-303-21	SWITCH, TACTILE (EDIT)	
S602	1-554-303-21	SWITCH, TACTILE (CHECK)	
S603	1-554-303-21	SWITCH, TACTILE (CLEAR)	
S604	1-554-303-21	SWITCH, TACTILE (▶▶)	
S605	1-554-303-21	SWITCH, TACTILE (TIME)	
S606	1-554-303-21	SWITCH, TACTILE (REPEAT)	
S607	1-554-303-21	SWITCH, TACTILE (PLAY MODE)	
S608	1-554-303-21	SWITCH, TACTILE (▷ ❚❚)	
S609	1-554-303-21	SWITCH, TACTILE (■)	
S610	1-554-303-21	SWITCH, TACTILE (⏏ OPEN/CLOSE)	
S611	1-554-303-21	SWITCH, TACTILE (◀◀)	
S612	1-467-938-11	ENCODER, ROTARY (I◀◀ AMS ▶▶I)	
		< VIBRATOR >	
X601	1-579-233-11	VIBRATOR, CERAMIC (5MHz)	
**********			
		MISCELLANEOUS	
		**********	
4	1-769-621-11	WIRE (FLAT TYPE) (19 CORE)	
56	1-776-237-11	WIRE (FLAT TYPE) (23 CORE)	
101	1-452-719-11	MAGNET ASSY	
⚠ 155	8-848-367-11	PICK-UP, OPTICAL KSS-213B/K-RP	
158	1-769-069-11	WIRE (FLAT TYPE) (16 CORE)	
M101	X-4917-523-3	BASE (OUTSERT) ASSY (SPINDLE)	
M102	X-4917-504-1	MOTOR ASSY (SLED)	
M151	A-4604-363-A	MOTOR (L) ASSY (LOADING)	
**********			
		**********	
		HARDWARE LIST	
		**********	
#1	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
#2	7-685-647-79	SCREW +BVTP 3X10 TYPE2 N-S	
#3	7-621-255-15	SCREW +P 2X3	

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Sony Corporation
Consumer A&V Products Company
Home A&V Products Div.

9-960-505-11

English
96B0478-1
Printed in Japan
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Published by Home A&V Products Div.
Quality Engineering Dept.